Claims

1. A processing engine, comprising:

a plurality of matrix generators, wherein each matrix generator is configured for generating a matrix comprising elements of an interfering signal selected for cancellation;

a processor communicatively coupled to the matrix generators and configured for generating a cancellation operator from each matrix; and

a plurality of applicators, wherein each applicator is communicatively coupled to the processor and configured for applying one of the cancellation operators to an input signal to substantially cancel one of the interfering signals.

2. The processing engine of claim 1, wherein the processing engine is configurable with a receiver and wherein the processing engine further comprises a connection element configured for receiving output signals from the applicators and for selecting received said output signals as inputs to processing fingers of the receiver.

3. The processing engine of claim 2, wherein the connection element comprises a plurality of selectors wherein each selector is configured for receiving one of the output signals and for selecting said one of the output signals as one of the inputs to one of the processing fingers.

4. The processing engine of claim 3, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Code Division Multiple Access signals as one of the inputs to one of the processing fingers.

5. The processing engine of claim 3, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Wideband Code Division Multiple Access signals as one of the inputs to one of the processing fingers.

6. The processing engine of claim 3, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Global Positioning System signals as one of the inputs to one of the processing fingers.

7. The processing engine of claim 3, wherein the output signals are interference cancelled signals.

8. The processing engine of claim 1, wherein each cancellation operator is a projection operator configured for projecting a selected signal substantially orthogonal to one of the interfering signals.

9. The processing engine of claim 8, wherein the projection operator comprises the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is one of the matrices and S^T is a transpose of said one of the matrices.

10. The processing engine of claim 1, wherein each of the cancellation operators comprises the form:

$$y' = y - S(S^T S)^{-1} S^T y,$$

where y' is an output cancelled signal, y is a received signal, S is one of the matrices and S^T is a transpose of said one of the matrices.

11. The processing engine of claim 1, further comprising an interference selector configured for selecting the interfering signals as inputs to the matrix generators.

12. The processing engine of claim 11, wherein the interference selector is further configured for providing on-time interfering PN codes of the interfering signals to the matrix generators.

13. The processing engine of claim 11, wherein the interference selector selects the interfering signals based on a pre-determined criteria selected from a group consisting of amplitude, timing offset, phase and code sequence.

14. A method of canceling interference, comprising:

generating a plurality of matrices, each matrix comprising elements of an interference signal selected for cancellation;

generating a cancellation operator from each of the matrices; and

applying each cancellation operator in parallel to an input signal to substantially cancel one of the interference signals.

15. The method of claim 14, wherein generating the cancellation operator comprises generating a projection operator having a form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is one of the matrices and S^T is a transpose of said one of the matrices.

16. The method of claim 14, wherein applying comprises substantially canceling said one of the interfering signals according to the form:

$$y' = y - S(S^T S)^{-1} S^T y,$$

where y' is an output cancelled signal, y is a received signal, S is one of the matrices and S^T is a transpose of said one of the matrices.

17. The method of claim 14, further comprising selecting the interference signals for input to the matrices.

18. The method of claim 17, further comprising providing on-time interfering PN codes of the interfering signals to the matrices in response to selecting.

19. The method of claim 14, further comprising selecting output signals generated in response to applying, for assignment of the output signals to processing fingers of a receiver.

20. The method of claim 19, further comprising transferring the output signals to the processing fingers in response to selecting said output signals as input signals to the processing fingers.

21. The method of claim 19, wherein the output signals are interference cancelled signals.

22. The method of claim 14, further comprising receiving a Code Division Multiple Access signal.

23. The method of claim 14, further comprising receiving a Wideband Code Division Multiple Access signal.

24. The method of claim 14, further comprising receiving a Global Positioning System signal.

25. A system for canceling interference, comprising:

means for generating a plurality of matrices, each matrix comprising elements of an interference signal selected for cancellation;

means for generating a cancellation operator from each of the matrices; and

means for applying each cancellation operator in parallel to an input signal to substantially cancel one of the interference signals.

26. The system of claim 25, wherein the means for generating the cancellation operator comprises means for generating a projection operator having a form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is one of the matrices and S^T is a transpose of the one of the matrices.

27. The system of claim 25, wherein the means for applying comprises means for substantially canceling said one of the interfering signals according to the form:

$$y' = y - S(S^T S)^{-1} S^T y,$$

where y' is an output cancelled signal, y is a received signal, S is one of the matrices and S^T is a transpose of said one of the matrices.

28. The system of claim 25, further comprising means for selecting the interference signals for input to the matrices.

29. The system of claim 25, further comprising means for providing on-time interfering PN codes of the interfering signals to the matrices in response to selecting.

30. The system of claim 25, further comprising means for selecting output signals generated in response to applying, for assignment of the output signals to processing fingers of a receiver.

31. The system of claim 30, further comprising means for transferring the output signals to the processing fingers in response to selecting said output signals.

32. The system of claim 30, wherein the output signals are interference cancelled signals.

33. The system of claim 25, further comprising means for receiving a Code Division Multiple Access signal.

34. The system of claim 25, further comprising means for receiving a Wideband Code Division Multiple Access signal.

35. The system of claim 25, further comprising means for receiving a Global Positioning System signal.

36. A mobile handset, comprising:

a receiver configured for receiving a radio signal; and

a processing engine communicatively coupled to the receiver and comprising

a plurality of matrix generators, wherein each matrix generator is configured for generating a matrix comprising elements of an interfering signal selected for cancellation,

a processor communicatively coupled to the matrix generators and configured for generating a cancellation operator from each matrix, and

a plurality of applicators, wherein each applicator is communicatively coupled to the processor and configured for applying one of the cancellation operators to an input signal to substantially cancel one of the interfering signals.

37. The mobile handset of claim 36, wherein the processing engine further comprises a connection element configured for receiving output signals from the applicators and for selecting received said output signals as inputs to processing fingers of the receiver.

38. The mobile handset of claim 37, wherein the connection element comprises a plurality of selectors wherein each selector is configured for receiving one of the output signals and for selecting said one of the output signals as one of the inputs to one of the processing fingers.

39. The mobile handset of claim 38, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Code Division Multiple Access signals as one of the inputs to one of the processing fingers.

40. The mobile handset of claim 38, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Wideband Code Division Multiple Access signals as one of the inputs to one of the processing fingers.

41. The mobile handset of claim 38, wherein each selector is further configured for receiving a digitized radio signal comprising one or more Global Positioning System signals as one of the inputs to one of the processing fingers.

42. The mobile handset of claim 38, wherein the output signals are interference cancelled signals.

43. The mobile handset of claim 36, wherein each cancellation operator is a projection operator configured for projecting a selected signal substantially orthogonal to one of the interfering signals.

44. The mobile handset of claim 43, wherein the projection operator comprises the form:

$$P_s^{\perp} = I - S(S^T S)^{-1} S^T,$$

where $P_s^{\perp}$ is the projection operator, I is an identity matrix, S is one of the matrices and S^T is a transpose of said one of the matrices.

45. The mobile handset of claim 36, wherein each of the cancellation operators comprises the form:

$$y' = y - S(S^T S)^{-1} S^T y,$$

where y' is an output cancelled signal, y is a received signal, S is one of the matrices and S^T is a transpose of said one of the matrices.

46. The mobile handset of claim 36, further comprising an interference selector configured for selecting the interfering signals as inputs to the matrix generators.

47. The mobile handset of claim 46, wherein the interference selector is further configured for providing on-time interfering PN codes of the interfering signals to the matrix generators.

48. The mobile handset of claim 46, wherein the interference selector selects the interfering signals based on a pre-determined criteria selected from a group consisting of amplitude, timing offset, phase and code sequence.

49. The mobile handset of claim 36, wherein the radio signal comprises a Code Division Multiple Access signal.

50. The mobile handset of claim 36, wherein the radio signal comprises a Wideband Code Division Multiple Access signal.

51. The mobile handset of claim 36, wherein the radio signal comprises a Global Positioning System signal.